

623.06. BASIS OF PAYMENT.

The accepted quantities of the various items, measured as provided above, will be paid for at the contract unit price as follows:

- (A) BEAM GUARD RAIL-W-BEAM-SINGLELINEAR FOOT (METER)
- (B) BEAM GUARD RAIL-W-BEAM DOUBLE LINEAR FOOT (METER)
- (C) BEAM GUARD RAIL-THRIE BEAM-SINGLE..... LINEAR FOOT (METER)
- (D) BEAM GUARD RAIL-THRIE BEAM-DOUBLE LINEAR FOOT (METER)
- (E) BEAM GUARD RAIL-TRANSITION SECTION EACH
- (F) GUARD RAILANCHOR UNIT EACH
- (G) GUIDE POSTS EACH

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

SECTION 624 FENCES

624.01. DESCRIPTION.

This work shall consist of the construction of fence and gates in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the Plans or established by the Engineer.

The style, type, and/or class of fence will be as shown on the Plans. The styles are designated as follows:

- (a) Fence, Style WWF (Woven Wire Fence)
- (b) Fence, Style SWF (Strand Wire Fence)
- (c) Fence, Style CLF (Chain Link Fence)
- (d) Fence, Style GDF (Glare Deflector Fence)
- (e) Fence, Metal Panel

Fence gates shall be installed at locations shown on the Plans or as directed by the Engineer, and in accordance with the Plans.

624.02. MATERIALS.

Materials shall meet the requirements specified in the following Subsections of Section 700 - Materials:

Portland Cement Concrete, Class A	701.
Zinc Rich Paint	730.02
Fence, Style WWF	732.06
Fence, Style SWF	732.06
Fence, Style CLF	732.07
Fence, Style GDF	732.08

When not specified on the Plans or in the Proposal, the kind of post, hardware, and fittings meeting the requirements of Section 732 shall be optional, but the kind selected shall be used throughout the project unless otherwise approved in writing by the Engineer.

624.04. CONSTRUCTION METHODS.

- (a) **General.** Perform such clearing and grubbing as may be necessary to construct the fence to the required grade and alignment.

NOTE: Existing fencing on permanent right-of-way when the work order is issued will become the responsibility of the Contractor.

At locations where breaks in a run of fencing are required, or at intersections with existing fences, make appropriate adjustment in post spacing. Cross fencing connections shall include an end post approximately perpendicular to the right-of-way fence, or at an angle dictated by the route of the cross fence.

Concrete. When the Plans require that posts, braces, or anchors be embedded in concrete, install temporary guys, or braces, as may be required, to hold the posts in proper position until such time as the concrete has set sufficiently to hold the posts. Unless otherwise permitted, do not install materials on posts or place strain on guys and bracing that are set in concrete until five days after the placing of the concrete.

Driving Option. Instead of being set in concrete footings or tamped in earth holes, line posts may be driven with the approval of the Engineer. For the driving option, wooden line posts shall be sharpened by the supplier prior to preservative treatment, and the top shall be protected.

NOTE: Splitting or damage to the post top as a result of the driving operation will be cause for rejection. Field sharpening or taper dressing will not be allowed.

Metal posts shall also have a fitted impact head to minimize deformation or damage to the galvanized or painted finish. After driving the metal posts, clean any deformed and/or damaged tops and paint them with a zinc-rich paint.

NOTE: Severely deformed or poorly painted tops will be cause for rejection.

Offset Control. Exercise adequate plumb and offset (alignment) control to assure a smooth profile and alignment. In shallow depressions, use extra length posts and barbed wire fans to maintain a smooth top-of-fence profile. Strengthened fence construction and the use of movable water gates may be necessary in installations over deep ravines.

NOTE: Under no circumstances shall swales or ravines subject to periodic water flow be filled to facilitate fence construction. Adequate provision for drainage must be maintained.

Installations in Rock. For installations in earth and soft rock (softer than medium sandstone), the following criteria shall be adhered to: driven posts shall reach the minimum embedment as shown on the Plans unless refusal of the post is reached. Refusal is defined as 1 inch (25 mm) or less entry per minute of driving with a 60 pound (27 kilograms) hammer using mechanical or pneumatic means, delivering a minimum of 60 blows per minute. If refusal is encountered at 24 inches (610 mm) or deeper, the post may remain and be top cut for profile control. If refusal is encountered at less than 24 inches (610 mm) depth, the post shall be pulled and a concrete

footing, of the dimensions as shown on the Plans for earth installations, shall be installed.

For installations in *medium to hard rock* (medium sandstone or harder) when encountered at the surface, the following criteria shall be adhered to: A hole of the diameter and depth for footings in rock, as shown on the Plans for the type of post being used, shall be drilled. The post shall then be inserted, plumbed, and braced, and the hole filled with lean grout.

The procedure for installations when *medium to hard rock is encountered under a layer of earth* is as follows: At any depth less than the minimum driven embedment (as shown on the Plans) at which rock is encountered, the earth shall be augered and treated like a regular concrete-embedded earth footing. Drill a hole of the diameter for footings in rock (as shown on the Plans for the type of post being used) shall to a depth which will yield the total minimum earth embedment, or the minimum rock embedment, whichever occurs first. Then half fill the rock hole with an approved type of lean grout (thin hydraulic cement); insert, plumb, and brace the post; and fill the remainder of the rock hole with lean grout. Concrete for earth footing may be immediately placed above the grouted hole.

NOTE: The intent is for all driven posts to be firmly in the earth a minimum of 24 inches (610 mm) where driving has been refused, or the minimum earth embedment as shown on the Plans, unless rock is encountered. The minimum rock embedment shall be required unless the total minimum earth embedment is reached prior to the rock embedment being reached. When these conditions have been fully satisfied, the post may be top cut for profile control.

Aligning Posts. Set the tops of all posts approximately to the required grade and alignment.

NOTE: Cutting of the tops of the posts will be allowed only with the approval of the Engineer or under the conditions specified herein or on the Plans.

After cutting wood posts (no flame cuts allowed), paint the tops with a preservative solution. Clean cut areas on metal posts and paint them with a single coat of zinc-rich paint. Attach wire or fencing of the size and type required to the posts and braces in the manner indicated.

Stretch all wire taut and install it to the required elevations.

Grounding the Fence. At each location where an electric transmission, distribution, or secondary line crosses any of the types of fences covered by the Specifications, ground the fencing in accordance with the following: Install a galvanized or copper-coated steel ground rod 8 feet (2.4 m) long having a minimum diameter of 1/2 inch (13 mm) directly below the point of crossing. Drive the rod vertically until the top is 6 inches (150 mm) below the ground surface. Use a No. 6 solid copper conductor or equivalent to connect each fence element to the grounding rod. Either braise or fasten the connections with approved non-corrosive clamps.

When a powerline runs parallel or nearly parallel to and above the fence, ground the fence at each end and gate post and at intervals not to exceed 1500 feet (450 meters).

Provide the abutting property owners with the equivalent property protection given by the existing fences.

NOTE: The Contractor shall be responsible for the maintenance of all fences and gates that he constructs during his construction operations.

- (b) **Fence, Style WWF (Woven Wire Fence).** This item shall consist of woven wire fabric with smooth, barbless, or barbed wire strands on a steel and/or wood post system.

(1) **Alignment.** The Plan sheets show the general alignment, angles, corners and attachment types at culverts. In general, construct fence on the permanent right-of-way line and attach wire to the private property side of the fence posts. On curves, place wire fabric on that side of the post which will maintain the wire in a taut condition. Where the right of-way fence is to be constructed, clear the area of obstructions and level the ground of minor irregularities.

(2) **Setting Posts.** Line posts shall be of the size indicated on the Plans and shall be set on the permanent right-of-way line, or to a line shown on the Plans or approved by the Engineer, and in a reasonably true line on the property owner's side to which wire generally is to be attached. Embed them in the ground to the depth shown on the Plans, tamping and firmly setting them. Spacing between line posts shall not exceed the dimensions shown on the Plans. Set additional posts at each abrupt change in grade, alignment, and/or at locations approved by the Engineer.

Extra-length posts (fan posts) shall be required at small depressions where it is not practicable for the fence to follow closely to the contour of the ground. At such small ground depressions, close the space below the bottom of the fence fabric with wire, stretched taut between posts, either on horizontal lines or fanned at 6 inches (150 mm) maximum spacing, as shown on the Plans or as approved by the Engineer. Stretch the wires taut, and securely fasten them to the posts to prevent vertical movement of the wires.

Concrete for encasing posts as indicated on the Plans may be poured without forming if the excavation is of sufficient stability to receive the concrete without caving or sliding in. However, if specified by the Engineer, footings shall be formed.

(3) **Placing Fencing.** Fasten barbed wire, barbless wire, or smooth wire to all fan, end, corner, gate and/or stretcher posts, and to all line posts by substantial and approved means. Use tools designed for the purpose in accordance with the manufacturer's recommendations. Apply the tension for stretching by using mechanical fence stretchers or single-wire stretchers designed for the purpose. Stretch all strands taut to a tensile force of approximately 300 pounds (136 kilograms) as shown on the Plans, or as recommended by the manufacturer.

Splice strand wire and wire fabric using a mechanical device of an approved type, or make a wire splice in the following manner: carry the ends of wires 2 inches (50 mm) past the splicing tools and wrap them around both wires backward from the tool for at least five turns.

Stretch woven wire fabric uniformly tight by means of an approved mechanical tensioning device and in conformity to the location on the posts designated on the Plans. Parallel stays shall be straight, and uniformly spaced, as shown on the Plans. Staple each woven fabric wire and strand wire to wood posts or fasten it with approved fittings to steel posts. Cut or splice woven wire at stretcher or wood posts as required to prevent buckling or undue stretching.

Build attachment assemblies according to the Plans. When it is necessary to make attachments to culvert or bridge endwalls after the culvert is constructed, drill the hole with a drill of the same size as the expansion device, making the holes neat, without chipping or breaking the concrete.

- (c) **Fence, Style SWF (Strand Wire Fence).** This item shall consist of smooth, barbless, or barbed wire strands on a steel and/or wood post system; it shall be constructed in the same manner as fence-style WWF, except the fencing fabric shall consist of strands of an approved smooth wire, barbless wire, or barbed wire. Fence-style SWF shall have the number of strands of wire as shown on the Plans or as approved by the Engineer. The fence shall be set on the permanent right-of-way line.

- (d) **Fence, Style CLF (Chain Link Fence).**

This item shall consist of chain link type fabric fencing on galvanized steel or aluminum alloy post system—with or without barbed wire, smooth tension wire, or climb barrier systems.

- (1) **Alignment.** The provisions of Subsection 624.04(a) General and 624.04(b)1 fence-style WWF shall govern.
- (2) **Setting Posts and Placing Fencing** See Subsection 624.04(a) General for alternate driving criteria for line posts. Dig post holes to the minimum size and spacing as shown on the Plans. Set posts plumb, centering them in the hole and to the lines shown on the Plans. Place posts in the concrete before initial set; take care they're thoroughly puddled and supported plumb until the concrete has set. Do not stretch the wire until concrete in the post holes is at least five days old. Set all post braces before placing any wire.

Stretch the wire slightly above the tension recommended by the manufacturer for the season of the year in which the construction takes place, and allow it to slack away slightly when pullers are released. Attach pullers to the wire full width, and make ties in at least seven places on each post before releasing them. If desired, pulls may be made from two ways and jointed by inserting one picket. Place tension and barb wire after proper size of fabric has been placed. Place wire on the outside of the posts, with respect to the road, except on curves where wire shall be placed on the outside of the post with respect to the center of the curve.

- (3) **Concrete Wall for Fence.** Across ravines where it would not be practical to set posts and follow the ground line with the fence, set posts in a concrete wall as shown on the Plans and at locations directed by the Engineer. When a wall is constructed across any dry wash or periodically wet ravine, make provision for drainage. A partial wall on each bank with a water gate or fan in the center, or culverts through any solid wall will satisfy the drainage requirements.

3.1. *Concrete.* All concrete shall be Class "A" and meet the requirements of Section 701.

3.2. *Reinforcing Steel.* Reinforcing steel shall meet the requirements of Section 511.

- (e) **Fence, Style GDF (Glare Deflector Fence)**

This item shall consist of an approved mesh fence on ground-embedded posts, guard rail posts, parapet wall, or concrete median barrier.

- (1) **Alignment.** In general, this fence shall be constructed in the median, between opposing lanes of traffic. The Plan sheets shall show the general alignment, angles, and corners. On curves, place the wire fabric on the side of the post which will maintain the wire in a taut condition.
- (2) **Setting Post and Placing Fencing.** The provisions of Subsection 624.04(d)2 shall govern. For fence mounted on guard rail, bolt the fence post to the guardrail post shown on the Plans using the specified bolts. For fence mounted on parapet wall or median barrier, cast or drill

holes of the specified dimensions in the wall and fit them with pipe sleeves as shown on the Plans. Alternate attachment methods will be threaded pipe flanges firmly attached to the top surface of the barrier wall.

Space terminal posts at maximum 100 feet (30-meter) intervals or as shown on the Plans.

Truss diagonal braces from the brace end of the line post back to the terminal post, and fasten them to it by a brace band.

Install glare deflector fence fabric as shown on the Plans and securely fasten it to the line posts with wire ties spaced at approximately 14 inch (350 mm) intervals, and to the top and bottom tension wire with wire ties or hog rings, at a maximum of 12 inches (300 mm) intervals. Tighten the chain link glare deflector fence to provide a smooth, uniform appearance.

Install stretcher bar-bands at a maximum of 11 inches (280 mm) intervals.

624.05. METHODS OF MEASUREMENT.

Fence will be measured by the linear foot (meter). Measurement will be along the ground line of the fence from outside to outside of end posts for each continuous run of fence. Connections to cross fences will not be measured separately, but costs shall be included in price bid for fence.

Gates will be measured as complete units of the size, type, and class specified.

Concrete wall for fence, when specified, will be measured in accordance with the dimensions shown on the Plans and will be paid for under Section 509, Class A Concrete or Class A Concrete for Small Structures and Section 511, Reinforcing Steel.

624.06. BASIS OF PAYMENT.

The accepted quantities of fence, measured as provided above, will be paid for at the contract unit price per meter of fence and per each for gates of the types and sizes as follows:

(A)	FENCE, STYLE WWF	LINEAR FOOT (METER)
(B)	GATES, STYLE WWF	EACH
(C)	FENCE, STYLE SWF	LINEAR FOOT (METER)
(D)	FENCE, STYLE CLF	LINEAR FOOT (METER)
(E)	GATES, STYLE CLF	EACH
(F)	FENCE, STYLE GDF	LINEAR FOOT (METER)

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.